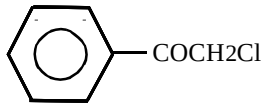
2-CHLOROACETOPHENONE

2-Chloroacetophenone is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 532-27-4

Molecular Formula: C_8H_7ClO



2-Chloroacetophenone is a colorless to gray crystalline solid. It has an odor which, in very low concentrations, resembles apple blossoms. It is practically insoluble in water but freely soluble in alcohol, benzene, acetone, petroleum ether, and carbon disulfide. When it is heated to decomposition, it emits toxic fumes of chloride (Sax, 1989).

Physical Properties of 2-Chloroacetophenone

Synonyms: chloromethyl phenyl ketone; mace; 2-chloro-1-phenylethanone; phenacyl chloride

Molecular Weight:	154.60
Boiling Point:	244 - 245 °C
Melting Point:	58 - 59 °C
Vapor Pressure:	0.012 mm Hg at 20 °C
Density/Specific Gravity:	1.324 at 15 °C
Conversion Factor:	1 ppm = 6.32 mg/m^3

(HSDB, 1991; Merck, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

2-Chloroacetophenone is emitted from sources where it is used as a pharmaceutical intermediate or when used as a riot control gas (Sax, 1987).

B. Emissions

No emissions of 2-chloroacetophenone from stationary sources in California have been reported, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of 2-chloroacetophenone was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board ambient concentration data exist for 2-chloroacetophenone.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of 2-chloroacetophenone was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

2-Chloroacetophenone is expected to exist in the atmosphere in the gas phase. The dominant atmospheric loss process for 2-chloroacetophenone is expected to be by reaction with the hydroxyl radical. However, no data are available concerning the rate constant for this reaction (Atkinson, 1995). No information on the atmospheric half-life and lifetime of 2-chloroacetophenone was found in the readily-available literature.

AB 2588 RISK ASSESSMENT INFORMATION

2-Chloroacetophenone emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to 2-chloroacetophenone are inhalation, ingestion, dermal contact, and eye contact (HSDB, 1991).

Non-Cancer: 2-Chloroacetophenone is a severe eye, skin, and respiratory tract irritant. Airborne exposure can cause burning of the eyes with lacrimation, some blurred vision, possible corneal damage, irritation and burning of the nose, throat, skin, burning in the chest with dyspnea, and laryngotracheobronchitis (U.S. EPA, 1994a).

The United States Environmental Protection Agency (U.S. EPA) has determined a Reference Concentration (RfC) for 2-chloroacetophenone of 3×10^{-5} milligrams per cubic meter based on squamous hyperplasia of the nasal respiratory epithelium in rats. The U.S. EPA estimates that

inhalation of this concentration or less, over a lifetime, would not likely result in the occurrence of chronic non-cancer effects. The U.S. EPA has not established an oral Reference Dose (RfD) (U.S. EPA, 1994a).

No information is available on adverse developmental or reproductive effects in humans or animals (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of 2-chloroacetophenone in humans. Rats and mice were chronically exposed to 2-chloroacetophenone by inhalation in a National Toxicology Program study. A marginal increase in fibroadenomas of the mammary gland was observed in female rats. No exposure-related increase in the incidence of tumors was observed in mice (U.S. EPA, 1994a). The International Agency for Research on Cancer and the U.S. EPA have not classified 2-chloroacetophenone with respect to potential carcinogenicity (IARC, 1987a; U.S. EPA, 1994a).